

CLAIMS

What is claimed is:

- 1 1. A method of processing instructions in a microprocessor, comprising:
 - 2 (a) fetching instructions from an instruction memory, certain fetched instructions being
 - 3 load instructions (loads) and causing load operations, and other fetched instructions being store
 - 4 instructions (stores) and causing store operations;
 - 5 (b) executing the fetched instructions out of program order;
 - 6 (c) detecting a load/store order violation wherein a load executes prior to a store on
 - 7 whose data the load depends;
 - 8 (d) creating a store set for the load;
 - 9 (e) adding the store to the store set;
 - 10 (f) determining whether the store is poisoned by a previously poisoned instruction;
 - 11 (g) if the store is poisoned, setting a poison value that indicates that the store is
 - 12 poisoned; and
 - 13 (h) re-processing said load if said poison value associated with said store indicates the
 - 14 store has been poisoned.
- 1 2. The method of claim 1 wherein (g) includes setting a bit in a table.
- 1 3. The method of claim 1 wherein the store set includes a pointer that points to the poison
- 2 value.

1 4. The method of claim 1 wherein said store set includes a pair of tables which are used to
2 identify said store instruction.

1 5. The method of claim 4 further including clearing said poison value when said store is no
2 longer poisoned.

1 6. A method of processing a store instruction (store) to execute before a load instruction
2 (load) that target a common memory location, comprising:

3 (a) determining if the data to be written by said store is stale;
4 (b) if said data is stale, setting a value associated with said store; and
5 (c) if said value is set, re-processing said load to execute after said data is no longer
6 stale.

1 7. The method of claim 6 further including establishing a store set for said load to include said
2 store.

1 8. The method of claim 7 further including using said store set to access said value.

1 9. The method of claim 6 wherein said value comprises a poison bit.

1 10. A computer system, comprising:
2 a microprocessor;
3 an input device coupled to said microprocessor; and

memory coupled to said microprocessor, said memory containing executable instructions;

wherein said microprocessor:

fetches instructions from said memory, certain fetched instructions being load instructions (loads) and causing load operations, and other fetched instructions being store instructions (stores) and causing store operations;

executes the fetched instructions out of program order;

detects a load/store order violation wherein a load executes prior to a store on whose data the load depends;

creates a store set for the load;

adds the store to the store set;

determines whether the store is poisoned by a previously poisoned instruction;

if the store is poisoned, sets a poison value that indicates that the store is poisoned;

and

re-processes said load if said poison value associated with said store indicates the store has been poisoned.

11. The system of claim 10 wherein said poison value comprises a bit in a table.

12. The system of claim 10 wherein the store set includes a pointer that points to the poison value.

13. The system of claim 10 wherein said store set includes a pair of tables which are used to identify said store instruction.

1 14. The method of claim 13 wherein said microprocessor clears said poison value when said
2 store is no longer poisoned.

1 15. A computer system, comprising:
2 a microprocessor; and
3 memory coupled to said microprocessor, said memory containing a store instruction (store)
4 and a load instruction (load) that target a common memory location;

5 wherein said microprocessor:
6 fetches said load and store;
7 determines if the data to be written by said store is stale;
8 if said data is stale, sets a value associated with said store;
9 if said value is set, re-processes said load to execute after said data is no longer
10 stale.

1 16. The system of claim 15 wherein said microprocessor establishes a store set for said load to
2 include said store.

1 17. The system of claim 16 wherein said microprocessor uses said store set to access said
2 value.

1 18. The system of claim 15 wherein said value comprises a poison bit.

- 1 19. A microprocessor, comprising:
- 2 a fetch stage which fetches executable instructions from memory, certain fetched
- 3 instructions being load instructions (loads) and causing load operations, and other fetched
- 4 instructions being store instructions (stores) and causing store operations;
- 5 an execution stage coupled to said fetch stage which executes the fetched instructions out
- 6 of program order; and
- 7 logic coupled to said fetch and execution stages that detects a load/store order violation
- 8 wherein a load executes prior to a store on whose data the load depends, creates a store set for the
- 9 load, adds the store to the store set, determines whether the store is poisoned by a previously
- 10 poisoned instruction, if the store is poisoned, sets a poison value that indicates that the store is
- 11 poisoned, and re-processes said load if said poison value associated with said store indicates the
- 12 store has been poisoned.
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20. The microprocessor of claim 19 wherein said poison value comprises a bit in a table.
21. The microprocessor of claim 19 wherein the store set includes a pointer that points to the
- 22 poison value.
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1 24. A microprocessor, comprising:
2 a fetch stage which fetches instructions including a store instruction (store) and a load
3 instruction (load) that target a common memory location; and
4 logic coupled to said fetch stage which determines if the data to be written by said store is
5 stale, and if said data is stale, sets a value associated with said store and re-processes said load to
6 execute after said data is no longer stale.

1 25. The microprocessor of claim 24 wherein said logic establishes a store set for said load to
2 include said store.

3 26. The microprocessor of claim 25 wherein said logic uses said store set to access said value.

4 27. The microprocessor of claim 24 wherein said value comprises a poison bit.